Best MANAGEMENT PRACTICES

Plant Bed Management

7.1 Definition of Resource

Landscaped plant beds are the aesthetic focal point of a park. They provide color, texture, space definition, fragrance, wildlife habitat, and other benefits enjoyed by park visitors. In the Pacific Northwest, climatic conditions favor growing a wide variety of ornamental landscape plants and a rich palette of northwest native plants. These environmental conditions have allowed designers and gardeners of the Seattle Park system to create beautifully landscaped plant collections in the park system, acknowledged as one of the finest in the country. Careful management of these living assets is required to continue the heritage and maintain the value of this significant plant collection.

In this section, landscape plant beds in Seattle Park System are segregated into two subcategories: 1) Annual/Perennial plant beds and 2) Shrub/Tree beds and 3) Plant Combination Beds.

7.2 Goal Statement

Landscape plant beds shall be designed, constructed, and maintained in a manner that is aesthetically pleasing, that protects and enhances ecosystem function, natural resources, public health, and wildlife habitat, all through sustainable maintenance practices that model environmental stewardship to the community. Plant beds shall be maintained to a consistent standard for maximum efficiency of resources.

7.3 Definitions

7.3.1 Types of Plant Beds

Planted landscape beds are non-turf, planted areas that include woody plant material such as shrubs, trees, ground covers and herbaceous plants. Plant beds may include floral color displays such as perennials, annuals and bulbs, as well as other herbaceous plants such as ornamental grasses and ferns. These plant beds can be divided into two categories according to their design function, usage, and level of visibility:

1. **Annual/Perennial Beds**: Plants in these beds are annuals, perennials, and/or mix of annuals, perennials, and ornamental grasses.

    - **Floral Beds:** Free standing plantings of annual and perennial flowers. The site does not include shrubs or other plants. They are highly visible during the summer or fall blooming period and require a high standard of maintenance.

    - **Flower Borders:** Plantings in front of woody shrubs, trees, or adjacent to a building**.** The foliage of the shrubbery provides a background to set off the colors of the blossoms. Most of the annual/perennial beds in our park system are more likely to use flowers in borders rather than in beds.

2. **Shrub/Tree Beds**: Plants in these beds are shrubs, trees, or combination of trees, shrubs, groundcovers, and other woody plants.

3. **Plant Combination Beds**: These contain combinations of different type of plants, such as shrubs, trees, annuals, perennials and bulbs, without significant majority of any individual type. Many of the landscape plant beds in Seattle Parks are plant combination beds.

7.3.2 Types of Plants in Plant Beds

- **Annuals/biennials:** An annual is a plant that completes its life cycle in a year or less. Biennials normally produce only foliage in their first year, bearing flowers and completing their life cycle in the following season.

- **Bulb:** Any plant that grows from a shortened or thickened underground stem containing embryonic plant tissue is commonly called a bulb. Corms, rhizomes, tubers, and tuberous roots are also called bulbs, but a true bulb contains a developing plant surrounded by scales.

- **Ferns:** Any of numerous flowerless plants characteristically having fronds with divided leaflets and reproducing by spores.

- **Groundcovers:** Low growing herbaceous, evergreen or deciduous sub-shrubs, vines or spreading plants.

- **Ornamental grasses:** True grasses are members of *Gramineae*, the grass family, but many of the plants we think of as grasses are actually sedges and rushes, which belong respectively to *Cyperaceae*, the sedge family, or to *Juncaceae*, the rush family. Together these three families comprise the plant group known as ornamental grasses.

- **Perennial:** Perennials are non-woody plants that live for more than two years, with variable growth habits. Herbaceous perennials die to the ground at the end of each growing season and re-grow the following spring. Woody perennials have top growth that persists through the winter. Evergreen perennials keep their leaves year around.

- **Shrub:** Woody plant with multiple branches and no obvious trunk.

- **Tree:** Woody plant that normally produces a single or multiple trunk and branches forming a distinct elevated crown.

7.3.3 Maintenance Strategies

- **Biological control:** The use of biological agents such as insects or diseases to suppress or control pests.

- **Chemical control:** The use of a registered pesticide or other chemical agent to suppress or control a specific pest, such as weeds or insects.
- **Edging:** The restricting of plant growth across the border of a plant bed by manual, physical, or chemical means.
- **Fertilization:** The use of organic or inorganic nutrients to adjust fertility levels in the soil.
- **Irrigation**: The supply of water to plantings, either through automatic irrigation systems or manual systems, including soaker hoses.
- **Manual or mechanical control:** The use of hand or power tools to remove unwanted vegetation.
- **Mulching**: Use of wood chips, bark, composts, cardboard or other materials to cover bare soil areas to conserve water and soil temperature around plants.
- **New or Renovated Landscapes:** Are landscapes planted within one year and will be highly maintained through the plant establishment period of 1-3 years.
- **Weed control:** The suppression and control of undesirable plant species.

7.4 Policies and Guidelines

Maintenance Standards for Plant Beds: Level of visibility and site use dictate maintenance standards for plant beds. Even within the same park, maintenance techniques can differ for formal plantings and high-traffic areas as opposed to remote areas that may remain informal and natural. For that reason, plant bed BMPs are tailored to the specific requirements of plant material and site goals.

Special Gardens are designated park garden areas with significant plant collections or design style. These gardens have the highest visibility and require the highest standard of maintenance. Examples of special gardens include Kubota Garden and Volunteer Park Conservatory.

High-Visibility/Public Facility Landscapes are located in a focal point of a park and/or traffic zone. They have high visibility and require a high standard of maintenance. Annual/perennial beds fall in this category.

General Landscape Bed Areas have moderate visibility and a moderate standard of maintenance. An example in this category is a shrub bed.

Low-Visibility Bed Areas are plant beds that require moderate to high maintenance and as such may be targets for redesign or removal. These include shrub beds or natural areas.

The Mayor's Environmental Action Agenda (EAA): The EAA presents the City's goals and creates a framework for integrated City departmental environmental action.

Pesticide Reduction Program: This program is an outgrowth of the Seattle Environmental Management Program (EMP) that was adopted to promote environmental stewardship in City operations. The two goals of the program are 1) to eliminate the use of the most potentially hazardous herbicides and insecticides and (2) to achieve a 30 percent reduction in overall pesticide use. The program outlines overall policies and rules governing purchasing, storage and use of pesticides, specific reduction goals and strategies to reduce use.

Sustainable Infrastructure Initiative (SII): The SII is a component of the Mayor's Environmental Action Agenda. It encourages application of innovative approaches that provide basic services in ways that are resource-efficient and environmentally responsible through a variety of incentive programs. Sustainable design encompasses the following broad topics:

- Efficient management of energy and water resources
- Management of material resources and waste
- Restoration and protection of environmental quality
- Enhancement and protection of health and indoor environmental quality
- Reinforcement of natural systems
- Analysis of the life cycle costs and benefits of materials and methods

7.5 General Maintenance Practices

Consistent cultural care of landscape assets ensure a consistent standard of maintenance for planted beds in City parks and grounds. Please refer to Sections 6.6, Annual/Perennial Beds and 6.7, Shrub /Tree Beds and Combination Beds, for more specific information related to design and maintenance of those assets.

7.5.1 Plant Replacement

Planted beds are aesthetically pleasing and shall be kept in good condition. Remove dead or unhealthy plants as needed. Replace plants in plant beds according to existing Vegetation Management Plans or as dictated by the site conditions. This will ensure proper plant selection, good establishment and healthy growth of plants in landscape beds.

Site Preparation

1. Define and mark the shrub/tree bed line. Consider irrigation coverage, drainage, and mowing patterns when outlining the shrub/tree bed line.
2. Remove weeds. Avoid damaging any tree roots during site preparation.

3. Clean the site; grade and rake the bed, and add soil amendments if necessary.

4. Establish a well-defined bed edge.

Planting

1. **Review design:** Prior to ordering and purchasing shrubs and trees, the gardeners should review the design plan or blueprint to ensure the species and quantity of each plant are appropriate to the site.

2. **Order and purchase plant material:** The quality of the trees, shrubs, and ground cover selected from a nursery can be just as important as species selection, site evaluation, or planting and maintenance in determining the success of a landscape plant bed. Select the best specimens. Check the crown and trunk characteristics, roots and plant health of purchased materials.

3. **Spacing**: Proper spacing with consideration of mature size and spread of plants ensures good establishment. Good air circulation and availability of sunlight, water and nutrients will reduce weak growth and prevent disease development. Ground covers and floral plantings should be close enough to provide adequate coverage to prevent weeds, and provide effective display, without being too crowded at maturity.

4. **Onsite Design Adjustment:** Place lower plants toward the front of the bed or around irrigation heads. Adjust plant location to accommodate or preserve the tree roots, or any underground utilities.

5. **Planting Depth:** Plants must be placed at proper depth, taking into consideration room needed for mulches. Holes should not be dug deeper than pot depth to avoid settling. Trees and larger shrubs will settle so plant them a bit higher. Root bound material should be sliced, cut, or pruned before planting. The width of the hole should be a minimum of twice the diameter of the container or root ball. For bare-root plants, spread the roots out evenly without bending or crowding.

6. **Fertilizing:** Fertilize annual/perennial beds using a granular complete fertilizer by incorporating into soil before adding plants. It is best to wait until woody plants or trees are established before adding chemical fertilizers.

7. **Irrigation:** Water new plantings to settle soil and reduce transplant shock. Ensure adequate moisture levels during establishment and growing season.

8. **Mulching:** Mulch at planting time using compost, wood chips, or bark. Rake soil smooth and then add mulch. Avoid smothering small plants. Mulches must be weed free. A layer of compost or other fine mulch covered with 2-4 inches of coarse wood chips or bark is most effective in retaining moisture and suppressing weeds. Keep the mulch more than 3 inches away from the stems or trunk.

9. **Staking**: It is best to not stake young trees, but if needed trees may be staked for support, protection, or anchorage. If newly planted trees will not stand upright without support or if frequent, heavy winds are a problem, staking is necessary.

7.5.2 Edging

Edging controls plant growth from either entering or leaving a bed, in both adjacent lawn areas and/or plant material in the plant beds themselves. The main purpose of edging is to maintain a neat edge to the planted area.

Edging can be done by manual or chemical means. **Chemical edging** will be best achieved by applying herbicide during early spring to control the rhizomes and stolons from running into the flowering or shrub/tree beds. **Manual edging** will have similar results if done in early spring and again in mid to late summer. Remove all stolons and rhizomes of grasses. Physical barriers may also be effective, especially for bamboos and invasive tree roots.

- **Formal plantings** can be maintained by hand tools and mechanical means with the removal of clippings.
- **Informal plantings** can be maintained mechanically or chemically to control turf and weed encroachment onto mulched areas.

7.5.3 Irrigation (see also Irrigation Management - Chapter X, page XX)

- **Site conditions** such as soil type, slope, exposure, and moisture requirements of plants play a crucial role in plant water demand, and both frequency and duration of irrigation. Soil moisture levels should be regularly monitored and tested by digging.
- **Weather conditions**, such as temperature and rainfall, require monitoring and active adjustment of irrigation response. Generally, most plants require at least 1 inch of water per week. Drought tolerant plants, once established, may need less. Floral plantings, particularly in containers, may require more frequent watering. Check containers to make sure water is draining.
- **Infrequent, deep watering** is preferred. Avoid creating runoff.
- **Shrubs, ground covers, and flowers** planted in the root zones of large trees need more water to balance the competition from the tree roots. Even in fall or winter plants in this situation may dry out quickly.
- **Morning is the best watering time**, so leaves can dry off and avoid water borne diseases. Drip systems are useful in plantings sensitive to overhead watering.
- **Be sure to begin watering as soon as is necessary** in the spring. Be especially attentive during dry periods, such as May, and from July to September. Be aware that shrub plantings under eaves and in courtyards will dry out even in fall and winter.

- **Monitor plants for water stress.** Visually inspect plants for symptoms of water stress. Signs of water stress include drooping, wilting, yellow foliage, leaf or needle drop, brown leaf tips, and rot. Remember that water stress can be caused by either too much or too little supplemental water.

- **Monitor soil moisture levels** throughout the growing season and during dry periods year-round. Pull mulches aside to see whether the ground below is moist. Use a soil probe OR dig a narrow hole with a trenching shovel or trowel 2-6 inches deep to properly inspect soil moisture, especially if you suspect dry conditions or drainage problems.

- **Visually test and monitor the irrigation system** regularly. In March or April of every year, check automated irrigation systems for proper coverage. Contact SPR shops to make repairs or adjustments as necessary.

- **Consider pedestrian access**, park usage, and available personnel when establishing irrigation schedules.

- **Newly planted or renovated landscape beds**, or newly planted trees should be irrigated routinely until established (this is typically from one to three years). Automatic irrigation systems, if designed properly should provide adequate water for most plant needs. Monitor all plants throughout the year for drought stress.

7.5.4 Mulching

Mulching planted beds serves to conserve moisture, retain soil, suppress weed growth, moderate soil temperature, reduce compaction, and supply nutrients for plants and soil microbes. This treatment is also aesthetically pleasing, making it desirable for high, medium, or low visibility locations.

- **Materials:** Materials used for mulching include bark, compost, wood chips, GroCo/SteerCo, grass clippings, leaves, pebbles, crushed rock, nutshells, or coffee grounds. Wood chips should be composted for at least 6 months prior to application.

- **Depth of application:** This varies according to type of plant material. Keep mulch materials away from contact with trunk or crown of plants to avoid stem rot.

- **Bed edges:** The edge of the plant bed should be approximately 2-4” below the turf or surrounding landscape. Taper the edge gradually to the bed.

- **Annual/Perennial beds:** Mulch with a fine material such as SteerCo or sifted compost, taking care not to smother plant crowns. Generally mulch annual plantings at least 1 inch deep. A deeper layer of mulch will provide better weed suppression.

- **Shrub/Tree beds**: Usually can be mulched at 2-4”deep. Wood chips or bark is most commonly used. Sheet mulching with cardboard or newspaper topped with wood chips is another option.

- **Woodchips:** Uncomposted woodchips can deplete soil nitrogen as they decompose. Use of woodchips may require application of a nitrogen-rich fertilizer.

- **Fallen leaves:** The use of fallen leaves as mulch may be appropriate in some areas. Avoid using diseased or insect-infested material. Leaves will decompose more quickly if they are shredded. It is important to avoid smothering the roots of the desirable plants with too thick a layer. A two- inch layer is considered best.

7.5.5 Fertilization

Fertilizing, the use of organic or synthetically derived nutrient compounds, can be formulated to meet specific requirements for plantings.

- **Nutrients:** Nutrient requirements differ according to plant type and the desired performance of a plant. Turf grass and other plants grown for their vegetative growth require more nitrogen than plants grown for flower and seed production. Plants grown for flower and seeds require higher amounts of phosphorus and potassium. Too much nitrogen can cause excess growth, which will be more susceptible to insect and disease damage.

- **Application Timing:** Timing application to the biological cycle of the plants is important in maintaining optimum growth. Plants just becoming established may require higher amounts of potassium and phosphorus in the blend to encourage root development. Also, plants benefit most from fertilizer application at the onset of their new growth in the spring. Applications too close to fall may delay dormancy and promote soft growth, which can suffer winter damage.

- **Micronutrients:** Micronutrients are also important for plant health. It is best to test the soil to determine existing levels of these nutrients. An imbalance of nutrients can harm plants.

- **Soil pH:** The pH of the soil will determine whether to use an acid or base formulation of fertilizer, as well as the need for lime applications. Always test for pH before applying lime.

- **Formula:** Select a formulation that is best for the soil type and time of year. Cold weather slows the activity of soil microbes that make nutrients available to the plants. A slow-release formula is better suited to cold months, and decreases leaching into surrounding soils.

- **Floral Plantings:** Floral plantings can be fertilized at planting time with slow-release fertilizer. Flowers can also be supplemented during growing season with foliar feedings of liquid fertilizer.

- **Compost:** Compost can be applied as a nutrient source. It must be fully decomposed so that nutrients will be made available to plants. Most compost has no

more than 3% nitrogen, which is slowly released. Its main benefit is that it encourages beneficial soil microbial growth.

7.5.6 Pruning

If the right plant species is selected for the right spot and purpose in the landscape, it is usually unnecessary to prune mature, well-established trees and shrubs. When done improperly, pruning can be one of one of the most destructive horticultural practices. When major pruning is required, park users and adjacent neighbors need to be notified in advance of the work to be done. The **purpose of pruning is to**:

- Encourage and direct new growth and flowering
- Grooming for appearance by removing spent blooms and foliage
- Removing insect, disease, and weather damaged growth
- Training, maintaining or controlling size and shape; this is particularly important for trees and larger shrubs in their first few years.
- Maintaining visibility
- Improving safety
- Creating pedestrian andower access.

Pruning Considerations

- **Plant Selection:** Use appropriate plant materials that grow to the correct size for the space. Good plant selection reduces the need for frequent pruning.
- **Natural Form:** A natural form is most desirable in many park settings.
- **Growth Habit:** Growth habit and flowering cycles of specific plant material will determine optimum pruning method.
- **Timing:** The best time to prune most plant material is following flowering. However, dormant season pruning may be the easiest time to allocate resources to pruning.

The time to prune a tree depends on the kind of plant and the desired result. Best pruning time for radical renovation of shrubs and/or groundcovers is early spring, just prior to bud break, generally late February-early March. Older established evergreen groundcovers, such as ivy and vinca should be pruned in early spring before bud growth, tapering from edge of landscape or turf back 2-3’.

1. **Tree Pruning:**

   - ***Pruning Trees at Planting*:** Landscape trees should not be pruned at planting time except to remove damaged branches or to correct those that show serious structural problems.

   - ***Pruning to Train Young Trees*:** Prune a young tree only enough to direct its growth habit effectively and correct any structural weaknesses. Many trees produce an abundance of lateral growth. Direct this growth during the growing season by heading back or thinning out shoots competing with the leader or interfering with those selected for scaffold branches.

   - ***Pruning Mature Trees*:** The well spaced and branched tree will need little or no pruning for several years. Mature trees may need to be pruned for health and appearance, size control, pedestrian access and safety, and flowering and fruiting response.

   - ***Pruning Conifers and Other Narrow leaf Evergreens*:** Conifers usually require less pruning than broadleaf trees. Prune to control size, create special effects, and to shape form.

2. **Hedge Pruning:** Hedge pruning requires careful timing for optimum results:

   - First cut should be made as new growth begins to harden off

   - Last hedging should be made no later than mid-August

   - Hedges should be wider at bottom than top

   - Hedge pruning is labor-intensive and is best applied to plants with smaller leaves as they tolerate heavy pruning better.

   - Because the intensity of maintenance required, formally pruned hedges are not desirable in many park locations.

3. **Pruning Broadleaf Shrubs:**

   Prune shrubs to keep their natural shape unless they are used as formal hedges. Shearing (heading cuts) should not be widely used; thinning of older, taller growth should be the primary type of pruning.

4. **Pruning Ground Covers:**

   Pruning ground covers are usually necessary only to remove unhealthy tissue, awkward or straggling branches, or keep a plant from becoming too invasive. Many ground covers are prone to decline as they age; however, others are so vigorous that controlling their growth is an ongoing maintenance task. Periodic mowing is one way you can keep ground covers vigorous, neat, and healthy with no significant loss of attractiveness.

7.6 Annual/Perennial Beds

Sections 6.6 and 6.7 include specific BMPs for the individual types of plant beds.

7.6.1 Planning

The following are important planning considerations and procedures for planning annual/perennial beds within park facilities.

1. Current Site/Environmental Conditions

    a) Identify the existing plants: cleaning, pruning, dividing, and removing if necessary

    b) Soil type: loose and friable; pH 5.8-6.5

    c) Bed form and size as dictated by site conditions or design

2. Order plants from Jefferson Greenhouse during the year prior to planting and displaying. Order annuals and perennials together in September, and order winter annuals and bulbs by the end of June.

3. Irrigation: Determine the type of system onsite. Drought tolerant annuals and perennials are the best choice in an area that does not receive frequent irrigation.

7.6.2 Design

The success of your bed design and display creation depends on how well you think it out, considering all the factors.

Perennials are probably the most diverse plant group, providing a huge variety of shape, form, color, texture, and scent with which to design a planting. Annuals and biennials have an exceptionally diverse range of habits from low mat-formers to climbing plants, allowing them to fulfill many roles in different areas of gardens and parks.

1. **Flower Plant Selection:** Match the needs of plants to the exposure and conditions of the chosen site.

    - **Formal bed**: In a garden of formal design, use annuals and perennial in ordered or structured plantings to create a uniform display, to form a pattern, or to enhance or soften the edges of rigid lines of tiles, pathways, or hedges.

    - **Informal border:** In an informal, cottage-style garden and floral bed, use annuals and biennials among perennials, vegetables, herbs, shrubs and trees.

2. **Flower Plant Design:** Consider texture, height, and display interests of each individual plant species and varieties, as well as their combination of plants such as display patterns or sequences. This element should reflect the display's curb appeal

and visual draw. Its plant combination should also complement the surrounding environment or adjacent landscape of the park site.

3. **Flower Color Scheme:** Consider color effects – Punctuation, exclamation and accentuation. This element should work to draw attention the bed and to demonstrate an artistic harmony that unifies or contrast colors in time and space.

4. **Spacing:** Know your plants – how fast do they grow and how big do they get. Space the plant accordingly.

    a) A well spaced annual planting should knit together within a month of planting. The bed will then require less weeding and watering.

    b) Proper perennial bed spacing is based on the species and varieties of perennials chosen.

5. **Design Scheme:**

    c) Type of annual/perennial plants for this bed, considering color, texture, and display interests.

    d) Quantity of each species or varieties

7.6.3 Site Preparation

1. Remove existing annuals and perennials if needed; prune back overgrown plants.

2. Remove existing weeds by using mechanical, manual, or chemical methods. If considering chemical treatment, Round-Up needs to be applied up 7 days prior to planting.

3. Hand-dig or till the bed, adding soil amendments if necessary. Delay digging or tilling if bed is too wet. Digging or tilling breaks down the structure and aeration capacities of the soil. Hold off until conditions are better.

4. Fertilize using a broadcast spreader for good uniformity. Utilize a complete fertilizer on the bed after tilling. Fertilizer choices can include organic or synthetic.

7.6.4 Planting

1. **Planting Schedule:** Annuals and perennials are usually planted in spring or autumn.

    a) Pick up your plants within 1-2 weeks of notification by the Nursery that your plants are ready. Plants should be planted in the ground within 2 to 4 weeks from the time they are ready.

    b) Do site preparation in advance of plant pick up, especially for annual plants. Plants that are root bound may not establish well nor thrive in a bed.

c) Do not store the plants in your district yard for more than two weeks. Some plants may bloom out while in storage and thus will be lost for the rest of the season.

2. **Proper spacing:** see number 3) under Design section, page XX. Consult with the Jefferson Greenhouse or Atlantic Nursery staff for help with spacing requirements of particular annuals and/or perennials.

3. **Planting depth:** In general, soil should be level with the crown of the plant.

4. **Irrigation:** After the planting is completed, the first watering is very important as it seats the plants into the ground. Water routinely and thoroughly throughout the growing season.

5. **Mulching:** Annual/perennial beds should be mulched with a fine material such as Steerco or sifted compost, taking care not to smother plant crowns. Mulch used to protect an annual planting should be 1-inch deep. A deeper layer of mulch will provide better weed suppression.

7.6.5 Maintenance Strategies

1. Edging: A beautifully planted bed can be ruined by a poorly maintained edge. Keep edges well trimmed throughout the growing season.

2. Irrigation:

- Annuals/Biennials: Irrigate early in the morning. Foliage should be dry before evening. During extreme heat, water more frequently. Check soil moisture to make sure water is penetrating deep into the soil.

- Perennials: Water perennial plants regularly until established. Water mature perennials as needed. Mature perennials typically require little watering except during prolonged dry periods.

3. Grooming/Deadheading:

- Annuals/biennials: Groom and deadhead at least once per month. Remove all dead flower heads to promote continued flowering, to freshen the display and prevent self-seeding. Remove plants when the foliage starts to die down or when killed by frost.

- Perennials: Most perennials produce vigorous shoots in spring. When the perennial plant is one-quarter to one-third of its final height, pinch out or cut back weak shoots; the remaining sturdy shoots will usually bear larger flowers. Deadhead regularly. In autumn, cut shoots down to the base, and remove dead and faded growth and weeds, leaving the border tidy in winter. Before spring growth appears, apply a mulch of organic matter to moist ground.

- Ornamental grasses: Delay cutting and mulching perennials and ornamental grasses until spring. The dry stems and flower and seed heads are beautiful winter accents.

4. **Weed Control:** Weed through the seasons. If not done routinely they can reseed or become unmanageable. This critical factor will reflect on the display quality and longevity of bloom.

5. **Fertilizing:** Monitor for fertilizer needs. Different annuals/perennials have varied nutrient requirements to look their best. When the foliage starts to lighten (light green), it is an indicator that plants need fertilizer.

    - Perennials: apply an annual top-dressing compost and/or a complete, balanced, slow-release fertilizer, preferably in early spring.

7.7 Shrub/Tree Beds and Combination Beds

7.7.1 Planning

In the Seattle Park system, most of our landscape plants beds are plant combination beds. Various combinations of shrubs, trees, and other woody plants frequently occur in our annual/perennial beds.

The following are planning considerations for shrub/tree beds within Seattle Parks and Recreation.

1. **Current Landscape Conditions:** The condition of current plant material is a good indicator of existing cultural conditions. Compaction, low nutrients, and types of pest populations determine renovation and plant selection options. This is particularly true of soil-borne pathogens such as phytophthera root rot. Another important factor to consider is the coverage of the existing large trees and their impact to other existing plants and future planting.
2. **Soil Type and Texture:** Soil may require amendment to improve drainage or water-holding capacity. Heavy clay or very sandy soils may be improved if desired.
3. **Drainage:** Irrigation and drainage conditions must be assessed and any improvements included in the design process.
4. **Cultural Conditions:** Determine all cultural conditions such as exposure to sunlight, reflected light and heat, wind, and rainfall.
5. **Safety and Traffic:** Call SPR In-House Locate to locate irrigation heads and underground utilities (sewer and drainage, water, and electrical). Call Dial-A-Dig (1 800-424-5555) to locate underground utilities not found. The Seattle PO # is 34267.

Safety issues include possible falling branches, plant growth that blocks pathways, visibility through shrub beds, and directing the flow of rerouting pedestrian traffic to sidewalks.

6. **Species Diversity:** Selecting pest-resistant plant materials is key to a successful planting. Species diversity also offers a longer season of interest. Monocultures can be more susceptible to total failure in case of insect or disease infestations.

7.7.2 Design

The following are design considerations for shrub/tree beds. For large landscape renovation of shrub/tree beds contracted or departmental landscape architects may be invited to work on design process.

1. Designer(s) and/or gardener(s) can minimize maintenance and future problems in the landscape beds by selecting **the right plant for the right place**. Consider functional uses, growth habit, environmental tolerances, and site adaptation when selecting plants.
2. Create low maintenance shrub/tree beds
3. Consider foot traffic path and/or bike/vehicle routes within areas adjacent to the beds.
4. Design the bed with maximum showing of outstanding plant characteristics and functions.
5. Assess and preserve view corridors.
6. Consider efficiency of maintenance and access convenience.

7.7.3 Site Preparation

1. To locate irrigation heads and underground utility lines call SPR shops In-House Locate.
2. Define and mark the shrub/tree bed line with consideration of irrigation coverage, drainage, and mowing patterns.
3. Remove weeds. Avoid damaging any tree roots during site preparation.
4. Clean the site, grade and rake the bed well, and add soil amendments if necessary.
5. Establish a well-defined bed edge.

7.7.4 Planting

1. **Review design:** Prior to ordering and purchasing shrubs and trees, the gardeners should review the design plan or blueprint to insure the species and quantity of each plant are appropriate to the site.

2. **Order and purchase plant material:** The quality of the trees, shrubs, and ground cover selected from a nursery can be just as important as species selection, site evaluation, planting and maintenance in determining the success of a landscape plant bed. Select the best specimens. Check the crown and trunk characteristics, roots and plant health of purchased materials.

3. **Spacing:** Proper spacing with consideration of mature size and spread of plants ensures good establishment. Good air circulation and availability of sunlight, water and nutrients will reduce weak growth and prevent disease development. Ground covers and floral plantings should be close enough to provide adequate coverage to prevent weeds, and provide effective display, without being too crowded at maturity. See the *Seattle Department of Parks and Recreation Standard Specifications* "Planting, Trees, Shrubs, and Ground Cover" (#02950.11) page XX or URL.

4. **On-Site Design Adjustment:** Place lower plants toward the front of the bed or around irrigation heads. Adjust plant location to accommodate or preserve the tree roots, or any underground utilities.

5. **Planting depth:** Plants must be placed at proper depth, taking into consideration room needed for mulches. Holes should not be dug deeper than pot depth to avoid settling. Trees and larger shrubs will settle so plant them a bit higher to allow for settling. Root bound material should be sliced, cut, or pruned before planting. The width of the hole should be a minimum of twice the diameter of the container or root ball. For bare-root plants, spread the roots out evenly without bending or crowding.

6. **Fertilizing:** Fertilizer, if needed, must be incorporated into soil before adding plants. It is best to wait until plants are established before adding chemical fertilizers. See the *Seattle Department of Parks and Recreation Standard Specifications* "*Plant Fertilizer*" (#02930.28), page XX. Or URL

7. **Irrigation:** Water new plantings to settle soil and reduce transplant shock. Ensure adequate moisture levels during the growing season.

8. **Mulching:** Mulch at planting time for maximum efficiency. Rake soil smooth and then add mulch. Avoid smothering small plants. Mulches must be weed free. A layer of compost or other fine mulch covered with 2-4 inches of coarse wood chips or bark is most effective in retaining moisture and suppressing weeds. Keep the mulch at least 3 inches away from the stems or trunk. In high visibility beds, a top layer of fine mulch may be desirable for aesthetic effect.

9. Staking: Trees should be staked for support, protection, or anchorage when needed. If newly planted trees will not stand upright without support or if frequent, heavy winds are a problem, staking may be necessary.

7.7.5 Maintenance Strategies

General Tasks

1. Edging: A beautifully planted bed can be ruined by a poorly maintained edge. Keep edges well trimmed throughout the growing season.

2. Irrigation:

- Annuals/Biennials: Irrigate early in the morning. Foliage should be dry before evening. During extreme heat, water more frequently. Check soil moisture to make sure water is penetrating deep into the soil.

- Perennials: Water perennial plants regularly until established. Water mature perennials as needed. Mature perennials typically require little watering except during prolonged dry periods.

3. Grooming/Deadheading:

- Annuals/biennials: Groom and deadhead at least once per month. Remove all dead flower heads to promote continued flowering, to freshen the display and prevent self-seeding. Remove plants when the foliage starts to die down or when killed by frost.

- Perennials: Most perennials produce vigorous shoots in spring. When the perennial plant is one-quarter to one-third of its final height, pinch out or cut back weak shoots; the remaining sturdy shoots will usually bear larger flowers. Deadhead regularly. In autumn, cut shoots down to the base, and remove dead and faded growth and weeds, leaving the border tidy in winter. Before spring growth appears, apply a mulch of organic matter to moist ground.

- Ornamental grasses: Delay cutting and mulching perennials and ornamental grasses until spring. The dry stems and flower and seed heads are beautiful winter accents.

4. Weed Control: Weed through the seasons. If not done routinely they can reseed or become unmanageable. This critical factor will reflect on the display quality and longevity of bloom.

5. Fertilizing: Monitor for fertilizer needs. Different annuals/perennials have varied nutrient requirements to look their best. When the foliage starts to lighten (light green), it is an indicator that plants need fertilizer.

- Perennials: apply an annual top-dressing compost and/or a complete, balanced, slow-release fertilizer, preferably in early spring.

Pruning

1. Tree Pruning:

- ***Pruning Trees at Planting*:** Landscape trees should not be pruned at planting time except to remove damaged branches or to correct those that show serious structural problems.

- ***Pruning to Train Young Trees*:** Prune a young tree only enough to direct its growth habit effectively and correct any structural weaknesses. Many trees produce an abundance of lateral growth. Direct this growth during the growing season by heading back or thinning out shoots competing with the leader or interfering with those selected for scaffold branches.

- ***Pruning Mature Trees*:** The well spaced and branched tree will need little or no pruning for several years. Mature trees may need to be pruned for health and appearance, size control, pedestrian access and safety, and flowering and fruiting response.

- ***Pruning Conifers and Other Narrow leaf Evergreens*:** Conifers usually require less pruning than broadleaf trees. Prune to control size, create special effects, and to shape form.

2. Hedge Pruning: Hedge pruning requires careful timing for optimum results:

- First cut should be made as new growth begins to harden off
- Last hedging should be made no later than mid-August
- Hedges should be wider at bottom than top
- Hedge pruning is labor-intensive and is best applied to plants with smaller leaves as they tolerate heavy pruning better.
- Because the intensity of maintenance required, formally pruned hedges are not desirable in many park locations.

3. Pruning Broadleaf Shrubs:

Prune shrubs to keep their natural shape unless they are used as formal hedges. Shearing (heading cuts) should not be widely used; thinning of older, taller growth should be the primary type of pruning.

4. Pruning Ground Covers:

Pruning ground covers are usually necessary only to remove unhealthy tissue, awkward or straggling branches, or keep a plant from becoming too invasive.

Many ground covers are prone to decline as they age; however, others are so vigorous that controlling their growth is an ongoing maintenance task. Periodic mowing is one way you can keep ground covers vigorous, neat, and healthy with no significant loss of attractiveness.

7.8 Integrated Pest Management (IPM)

7.8.1 Pest Tolerance Thresholds

Table 1 shows pest tolerance thresholds and IPM principles for selecting pest management strategies for plant beds.

Table 1. Pest Tolerance Thresholds for Plant Beds.

Area	Weeds 	Insects 	Disease 
General Landscape Beds	Some weeds acceptable. Goal is for bed areas to be generally free of weeds for both asset protection and appearance. Weeds will not be allowed to out-compete desirable landscape plants.	Generally tolerated unless particularly valuable plants are actually threatened.	Generally tolerated. Manual and cultural controls preferred. Chemical controls used only to preserve particularly valuable specimens.
Highly-visible/ Public facility landscapes	Generally not acceptable.	Generally tolerated unless they threaten particularly valuable plants. Manual removal of obvious pests is encouraged.	Generally tolerated. Manual and cultural controls preferred. Chemical controls used only to preserve particularly valuable specimens.
Special gardens/ Zoo exhibits	Generally not acceptable.	Generally tolerated but will not be allowed to damage or destroy valuable plants.	Generally tolerated. Manual and cultural controls preferred. Chemical controls used only to preserve particularly valuable specimens.
Floral beds	Generally not acceptable.	Generally tolerated.	Disease problems tolerated. If disease persists, landscape will be replaced.
Newly-established landscapes	Weed control is very important to ensure complete establishment of desired plants.	Generally tolerated. Presence of pests may result in host plant being removed and replaced.	Disease problems, if minor, will be tolerated. Presence of disease problems may result in host plant removal and replacement.

7.8.2 Weed Control

The most serious pest management issue in plant beds is weed control. As a result, weed control is the primary maintenance activity in plant beds. If uncontrolled, weeds not only make beds look untidy; but more importantly, they can choke out desirable landscape plants, resulting in loss of assets.

Weed through the seasons: Preventing weeds from infesting is more efficient than controlling them once established. Because one year's seeds can produce many years' weeds, the primary goal is to prevent weeds from going to seed. Some weeds produce seeds in summer, others in winter. Annual weeds reproduce by producing seeds every year, and can produce enormous quantities of seed, which can survive for years in the soil. Perennial weeds also reproduce by seeding, but their main means of reproduction tends to be vegetative. They can produce new top growth from buds located on the root structures or on above ground woody parts. Creeping grasses and clovers, buttercups, blackberry and morning glory vine spread year round by underground roots or stems, often spreading very quickly during their season of growth.

Before choosing a strategy, determine whether you are dealing with young or mature weeds, and whether they are annuals or perennials. Weed control is most effective on young plants. If annual weeds have grown beyond the seedling stage, it is important to remove them before they produce seeds. If perennial weeds have grown beyond the seedling stage, your control efforts must focus primarily on eliminating the perennial root resource. This is because perennial roots – bulbs, tubers, rhizomes, stolons, crowns and taproots – can continue to produce new top growth

Common Annual Weeds	Common Perennial Weeds
Chickweed	Thistles
Pimpernel	Morning Glory vine
Lambsquarters	Dandelions
Shotweed	Garlic Mustard
	Nightshades

Suppression and control strategies: Weeds are suppressed and controlled by habitat modification, including indirect or direct suppression strategies.

Habitat modification: is a key element in weed management and has three major components:

- Establishing realistic weed tolerance levels
- Modifying the habitat to minimize conditions that produce more weeds than you are willing to tolerate (indirect suppression)
- Focusing efforts on specific weed populations, such as modifying pH or changing fertility (direct suppression).

Indirect suppression/control: can also be referred to as mechanical and cultural control of weeds. It includes limiting resources such as water, such as through drip irrigation or limiting

light, using mulches, cover crops, or closer spacing of desired plants. For perennial weeds, this can also include repeated removal of the top growth or weedeating to remove top growth to draw down a plant's energy reserves.

Direct suppression/control: of weeds is the physical removal of the undesired plant. It includes the use of manual or mechanical controls, biological controls, or chemical control.

STRATEGIES

Mechanical/Cultural	Biological	Chemical
Hand pulling	Predator inoculation	Herbicides
Mowing/cutting/weedeating	Pathogen inoculation	Plant growth regulators
Heat alternatives	Grazing/browsing	
Solarization	Pheromone inoculation	
Cultivating		
Mulching		
Smothering		
Crowding		
Shading		

7.9 Training

Plant Bed BMP Overview

Plant Identification

Pruning Skill Building Techniques

7.10 Appendices Lists for Plant Beds Management

HARD COPY REFERENCES

1. Guidelines for Landscape Work Affecting Utilities

ONLINE REFERENCES

2. **Seattle Department of Parks and Recreation Tree Management, Maintenance, Pruning And/Or Removal Policy,** Number 060-P 5.6.1, June 1, 2001
3. http://parksweb/refs/policy/index.htm

4. **SPR Standards and Specifications**: All mandated SPR construction standards that apply to landscape projects. http://www.cityofseattle.net/parks/projects/standards/specs.asp

Appendix 1

Plant Bed Management

Guidelines for Landscape Work Affecting Utilities

Guidelines for Landscape Work affecting Utilities

Every time you are going to aerify turf, dig plant or remove trees and shrubs, add mulch, add soil, remove soil or sod, consider the impacts to utilities, both underground and aboveground. These utilities need to be located prior to beginning work.

Utilities may be located in out-of-the-way places or underground. Locations and especially the exact depth underground may not match plans or blueprints. Failure to accurately locate these utilities can delay your project, can cause significant damage to park landscapes or structures and can also result in serious injury or even death. Follow these guidelines, as applicable to your project or maintenance work, to make your work successful.

Remember that it is your project, job or maintenance task until completion! Be sure to follow through with all tasks and assist Shops whenever possible.

PLAN AHEAD.

- Identify a **Project Lead person** for this project or work.
- **DO NOT assume that there are no utilities in your site**. Look at an irrigation plan or other site blueprints or plans to determine possible utilities. Locate the exact areas where you are doing this work.
- If you have made a reasonable attempt to locate something on the plan and you just can't find it let the Plumbing Shop know.
- **Consider any reason you may need to adjust your schedule of work or move the work location.** For example, if the place you want to plant a tree is directly over an irrigation line, it is easier to adjust your location than to accidentally damage irrigation. Consider seasonal scheduling of your work or project so as not to impact special events or recreation programs like baseball. A work order needs to be requested for all in-house utility locates, moving plants, trenching or other additional work by the Shops or Horticulture crews.

AT LEAST TWO WEEKS PRIOR TO THE WORK STARTING DO THE FOLLOWING TASKS AT YOUR WORK SITE:

1. **Make a drawing** of the work that you are planning; indicate NORTH with an arrow.
2. **Call the Work Order Jobline and request an in-house locate** for the Electric Shop, the Plumbing Shop and the Sewer Crew. Fax a drawing of the work site with irrigation details to the Jobline: #684-7271
3. **You will need to call DIAL TO DIG—1-800-424-5555.** (The Parks contract ID# is 34267.) If you are not sure call one of the Shops. (Many Parks were streets at one time and many Parks have utilities running thru them.)
4. **Mark landscapes** with special **inverted solvent-based marking paint** from the Warehouse.
5. **Mark every location** at the site where the work is to be done.

AT LEAST TWO WEEKS PRIOR TO THE WORK STARTING DO THE FOLLOWING TASKS, continued:

6. **Mark** all irrigation heads, hose bibs, quick couplers, valves and valve boxes that you see on the plan that are within 15 feet of the work that you are planning.

7. **Mark the sprinkler heads** with a circle around them keeping the paint 4" away from the sprinkler.
8. **Uncover and make obvious** any valve boxes that you locate.
9. **Do not dig within two feet of any marked utilities**—if you are not sure what the marks are indicating, contact the Shops.
10. **If you determine** that there are irrigation heads, valves and/or valve boxes that need to be raised because of your work call in a separate work order and contact the Plumbing Shop to make arrangements to assist with digging, barricades or otherwise to complete your job.

1 TO 2 DAYS PRIOR TO THE LANDSCAPE WORK, DO THE FOLLOWING TASKS:

- **Hand dig excavation areas** and assist Shops whenever possible.
- **Re-mark landscapes** with special **inverted solvent-based marking paint** from the Warehouse; DO NOT use regular spray paint as it clogs sprinkler heads and other equipment.
- **Re-mark the work area** at the site where the work is to be done.
- **Re-mark all irrigation** heads, hose bibs, quick couplers, valves and valve boxes that you see on the plan that are within 15 feet of the work that you are planning.
- **Re-mark the sprinkler heads with a circle** around them keeping the paint 4" away from the sprinkler head.
- **Uncover and make obvious** any valve boxes that you locate.